

Research & Monitoring in the Soufriere Marine Management Area

Saint Lucia

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Research & Monitoring Program

- Background
- Research & Monitoring Framework
- The Role of Research & Monitoring in Management
- Routine Monitoring Activities

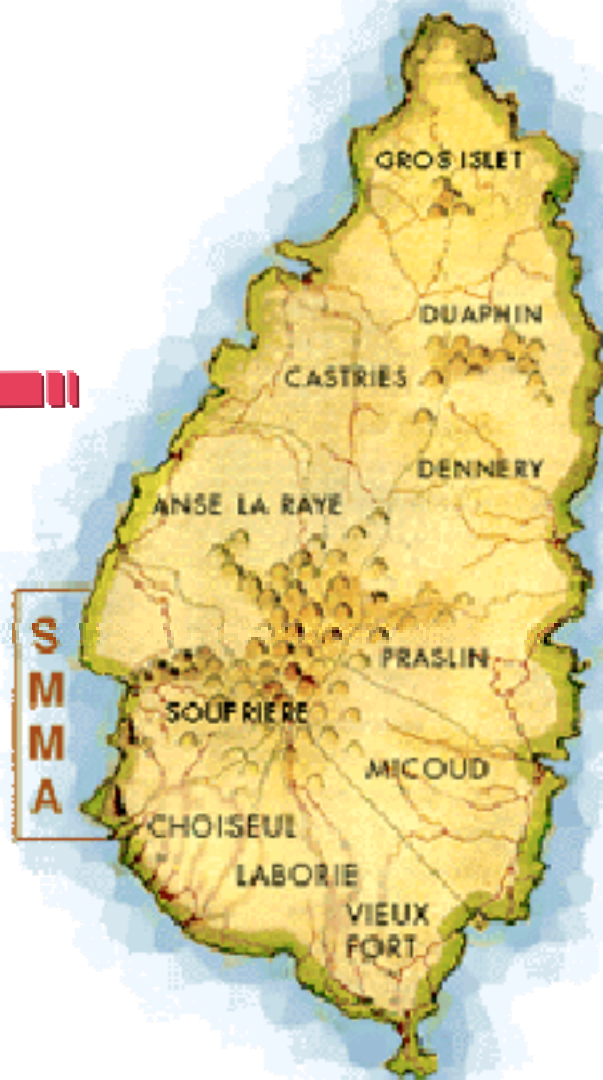




St. Lucia

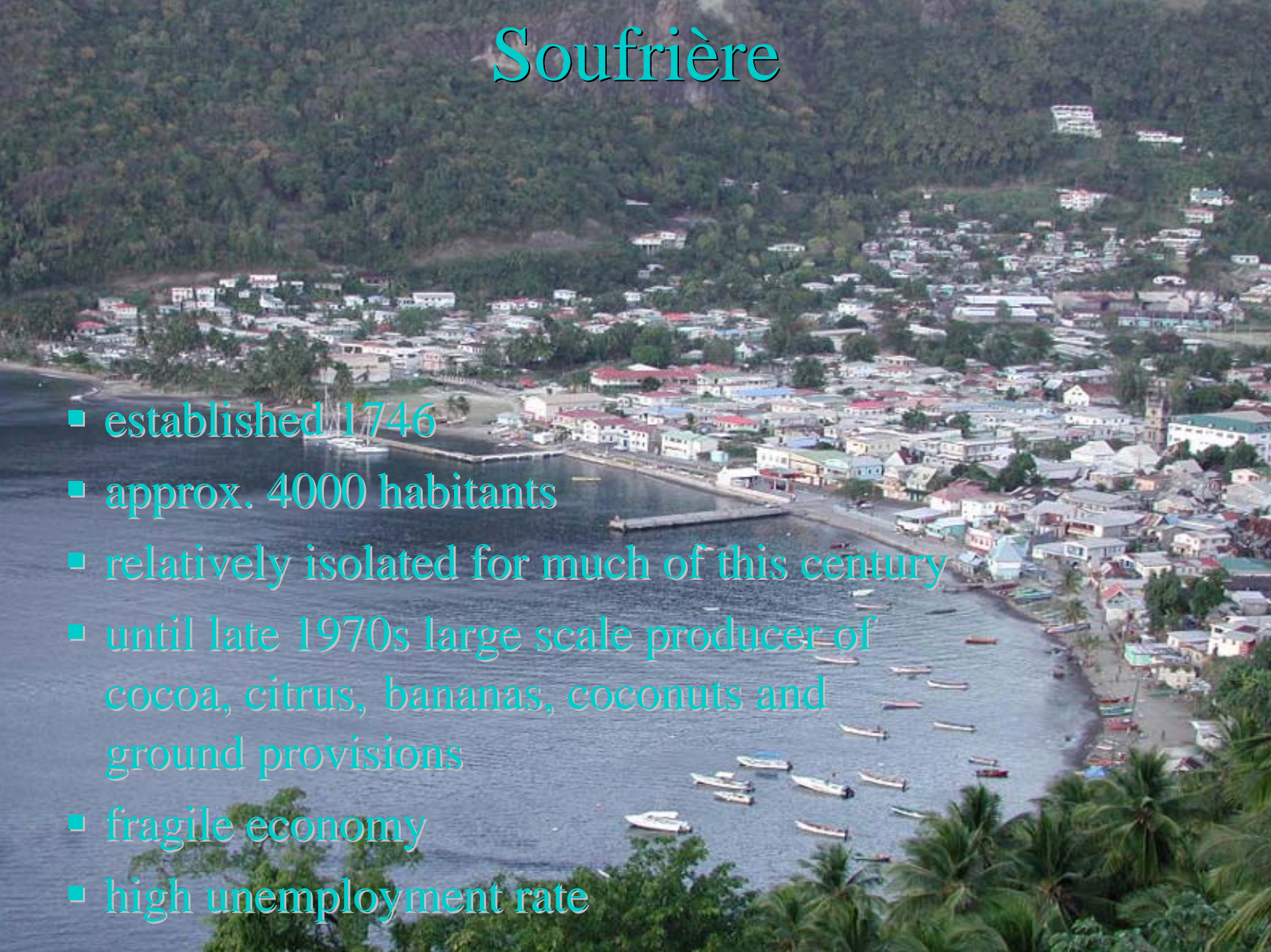


- about 162,157.00 inhabitants
- Between 60° and 61° West Longitude and 13 ° and 14 ° North Latitude
- 238 square miles
- approx. 1,300 miles southeast of Florida
- 21 miles to Martinique
- 24 miles north of St. Vincent



Soufrière

- established 1746
- approx. 4000 habitants
- relatively isolated for much of this century
- until late 1970s large scale producer of cocoa, citrus, bananas, coconuts and ground provisions
- fragile economy
- high unemployment rate



An aerial photograph of a coastal area. The water is a deep, dark blue. The shoreline is irregular, with a small, light-colored sandy beach area visible. The land is covered in dense, dark green forest. A few small buildings and structures are visible along the coast. The overall scene is a natural, somewhat rugged coastline.

Anse des Pitons

An aerial photograph of a large bay. The water is a deep, dark blue. The shoreline is irregular, with a small, light-colored sandy beach area visible. The land is covered in dense, dark green forest. A few small buildings and structures are visible along the coast. The overall scene is a natural, somewhat rugged coastline.

Soufriere Bay



Fishing Industry

- particular dependent on coastal resources
- furthest away from the migratory routes of valuable ocean species
- relies heavily on transient schools of coastal pelagics
- December to July: trawling for pelagic species
- rest of the year: reef fishing with bottom set gears



Tourism

- Favorite Destination of:
 - Yachtsmen
 - Scuba divers and
 - Day trippers
- Range of Attractions in Vicinity of Town:
 - Volcanic cones
 - waterfalls
 - Tropical forests
 - Solfaratas
 - Sheltered bays and
 - Coral reefs



Background

Degradation of resource base

result of over-exploitation of the reefs:

- a) over fishing
- b) improper fishing practices
- c) destruction of reef from anchoring
- d) land based sources of marine pollution

Conflicts

increasing competition
between recreational users
and fishermen over access to
resources

most acute conflicts between
divers and pot fishermen and
between seine fishermen and
yachts anchoring in seine
fishing areas



Establishment of a Management Regime

- 4 year participatory negotiation process involving the majority of stakeholder
- Descriptive assessment
 - Exercise delimitations limits of FPA and MPAs
- Field review/drawing of map
- Drafting of initial agreement
- Establishment of TAC and TWG
- 1997 Institutional Review
 - responding to severe internal problems
 - new agreement, among agencies with management responsibility, defining the vision, mission, objectives, regulations, zoning, programmes and institutional arrangements of the SMMA



Soufrière Marine Management Area Zoning Map



**SORRY,
NO JET SKIS
ALLOWED!**



Welcome to St. Lucia's West Coast... an area of outstanding beauty and diverse species, and the location of the Soufrière Marine Management Area (SMMA). In this rich area, we find superb scenery, healthy and diverse coral reefs, valuable fish stocks and attractive beaches.

Unfortunately, in recent years, these marine and coastal areas have been under increasing pressure from competing human activities.

In response to these threats, local fishermen, hoteliers, divers, yacht operators, government agencies, and community groups came together and negotiated an agreement which resulted in the formation of the Soufrière Marine Management Area in 1994.

Parties to the agreement believe that, with harmonious management and development, all economic activities can prosper without damaging the area's resources, now and in the future.

What Do We Do?

- ❑ The SMMA concerns itself with a range of activities that include:
 - ❑ Scientific research on the natural resources of the area.
 - ❑ Regular monitoring of coral reefs, water quality and other environmental factors and resources.
 - ❑ Public information and sensitization.
 - ❑ Provision of facilities for users of the SMMA, e.g. moorings.
 - ❑ Surveillance and enforcement of rules and regulations.

- ❑ Coordination of economic activities related to the SMMA and its resources.
- ❑ Promotion of technologies that are appropriate and linked with local environmental, social and cultural aspects of the SMMA.
- ❑ Conflict resolution among the various user groups whenever necessary.
- ❑ Maintenance of the principles of ongoing participation and public consultation.

What can you do?

- ❑ What part can you play in helping us conserve and sustainably manage our valuable marine and coastal resources?
 - ❑ Avoid touching the corals and other marine life when swimming, snorkeling, or scuba diving. Even the lightest touch of a fin or a camera, or sand stirred up from the bottom can cause damage.
 - ❑ Leave all plants, animals, fish, and shells in the sea, whether they are living or not. An empty shell can soon be home to a crab or small fish.
 - ❑ Observe the fish while snorkeling or scuba diving, but don't feed them. Feeding destroys their natural feeding habits.
 - ❑ Avoid disturbing mangroves or seagrass beds. They are critical parts of the marine environment.
 - ❑ Stay at least 100 meters from a blue and white Alpha flag, or a red and white diver's flag on a float or a boat in the water.
 - ❑ Look out for swimmers, snorkelers, and SCUBA divers when boating.
 - ❑ Limit your use of plastic and styrofoam containers.

- ❑ Tie up only to mooring buoys or anchor in designated sandy areas so that your anchor does not damage marine life.
- ❑ Do not collect or buy coral jewelry or other coral products. It is illegal to sell, take, buy or possess corals in St. Lucia.
- ❑ Do not buy jewelry or other products made of turtle shells. A moratorium on the capture and sale of turtles and their products was declared in St. Lucia on March 1st, 1998.
- ❑ Dispose all wastes properly whether on land or at sea.
- ❑ Tell others about the SMMA and set an example of proper behavior.

The operations of the SMMA are financed through user fees, souvenir sales, grants and membership fees.

For more information please contact:

The Soufrière Marine Management Association
P.O. Box 305, Soufrière, St. Lucia, West Indies
Phone: (758) 459-2500 Fax: (758) 459-7759
Email: smma@stlucia.org
Internet web-Site: <http://www.smma.org>
Marine VHF Channel 16

The SMMA is a proud partner of



The Soufrière Marine Management Area is managed through the support of dedicated government and non-governmental organizations, with generous assistance of the French Cooperation in the Lesser Antilles, the United Nations Environment Programme (UNEP), the Caribbean Environment Programme (CEP), the International Coral Reef Action Network (ICRAN), the Environment and Sustainable Development Unit of the Organisation of Eastern Caribbean States (OECS/ECSU), and the United States Agency for International Development (USAID). Also with technical assistance from the Caribbean Natural Resources Institute (CANARI).

The Board of Directors of the SMMA is headed by a President appointed by the Cabinet of Ministers and comprises:

- ❑ Permanent Secretary, Ministry of Agriculture Forestry & Fisheries
- ❑ Permanent Secretary, Ministry of Planning, Development, Environment & Housing
- ❑ Permanent Secretary, Ministry of Tourism & Civil Aviation
- ❑ Chairman, National Conservation Authority
- ❑ General Manager, St. Lucia Air & Sea Ports Authority
- ❑ Executive Vice President, St. Lucia Hotel & Tourism Association
- ❑ Executive Director, Soufrière Regional Development Foundation
- ❑ President, Soufrière Water Taxi Association
- ❑ President, Soufrière Fishermen's Cooperative
- ❑ Chairman, St. Lucia's Dive Association
- ❑ Soufrière District Representative



Learn about our Zones...

The uniqueness of the SMMA lies in our effort to manage the sustainable use and development of marine resources in the area, providing equitable sharing of those resources to stakeholders. In order to do this, the coastal area has been divided into a number of zones. These reflect the nature of the biological resource(s) and its potential contribution(s) to the development and well being of the people of Soufrière, and St. Lucia as a whole. Let us visit these zones:



Marine Reserve

The primary purpose of these areas is to allow fish stocks to regenerate in order to ensure healthy fish populations in the future. These areas of high ecological value have been set aside for the protection of all marine flora and fauna, scientific research, and the enjoyment of divers and snorkelers. Please note that access to the reserves is subject to the acquisition and conditions of a permit, which can be obtained through the local licensed dive operators, authorized dive leaders or the SMMA office in Soufrière.



Fishing Priority Area

Divers, snorkelers, yachters, please be aware that in these areas, commercial fishing has precedence over all other activities. Access by other users is allowed only to the extent that it does not interfere with any fishing activities.



Yachting Area

Anchoring is not allowed in the SMMA, thus moorings have been provided for visiting yachts. However, anchoring is allowed as an alternative in a small area north of Anse Chastanet, and the northern part of the Hummingbird beach, provided commercial fishing activities are not disturbed.



Multipurpose Area

In these zones, fishing, diving, snorkeling, and other legitimate uses are allowed, as long as the general rules of the SMMA and other national regulations are observed.



Recreational Area

For those of us who wish to sun bathe, play in the surf or simply feel the sand between our toes, these areas have been identified as important sites for public recreation, i.e., beaches where local access must be maintained.



SCUBA Dive Site

Get involved! Your support, contributions and ideas help us to protect our valuable resources.



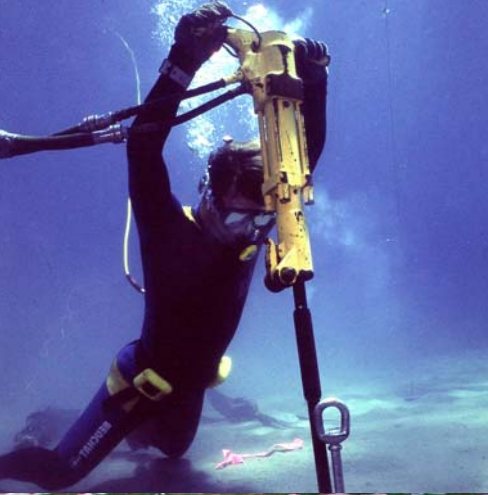
Institutional Arrangements

- Establishment of a not-for-profit company comprised of all the agencies, which have a demonstrated management function in the Area
 - five community and non-governmental organizations
 - St. Lucia Dive Association
 - Hotel and Tourism Association
 - Soufriere Fishermen's Cooperative
 - Soufriere Regional Development Foundation
 - Soufriere Water Taxi Association
 - five government agencies
 - Ministries of Planning, Fisheries and Tourism
 - National Conservation Authority
 - Air and Sea Ports Authority, and
 - one or two individuals nominated by the District Representative and the Cabinet of Ministers.
- Designation as a Local Fisheries Management Area
- Establishment of Stakeholder Committee



Day to Day Management

- Staffing
 - 5 Rangers, PRO, Admin. Assistant, Accountant, Manager
- Financing
 - Seed Funding
 - Revenue Generation
 - User Fee System
 - Diving
 - Yachting
 - Snorkeling
 - Marine Services
 - Souvenir Sales
 - Grants
- Infrastructure
 - Demarcation Signs and Buoys
 - Dive and Yacht Moorings
 - Surveillance Vessels



Front of Ticket:

DAILY DIVE PERMIT	
Name of Diver:	_____
Dive Operator:	_____
Date:	EC\$ 13.50
<i>Thank you for helping us to protect the environment</i>	
SOUFRIERE MARINE MANAGEMENT ASSOCIATION^{INC}	
P.O. Box 305, Bay Street, Soufriere, St. Lucia, W. I.	
Phone: (758) 459-5500 Fax: (758) 459-7799	
Internet Website: http://www.smma.org.lc	
Email: smma@canaw.lc	
Issued in Accordance with the Fisheries Act # 10 of 1984	
NO D40001	

Back of Ticket:

Use of all facilities and user zones within the Soufriere Marine Management Area (SMMA) is at the user's risk. The SMMA bears no responsibility for any loss or injury resulting from the use of the SMMA or its facilities. Purchase of this ticket signifies acceptance of these conditions.

<i>Protecting the Future</i>

© SMMA 2003



Programmes & Activities



- Scientific research on the natural resources of the region
- Regular monitoring of coral reefs, water quality and other environmental factors and resources
- Public information and sensitization
- Provision of facilities for users of the SMMA, e.g. moorings
- Coordination of economic activities related to the SMMA and its resources
- Promotion of technologies that are appropriate and linked with local environmental, social and cultural aspects of the SMMA
- Surveillance and enforcement of rules and regulations
- Conflict resolution among the various user groups whenever necessary
- Maintenance of the principles of ongoing participation and public consultation



Progress

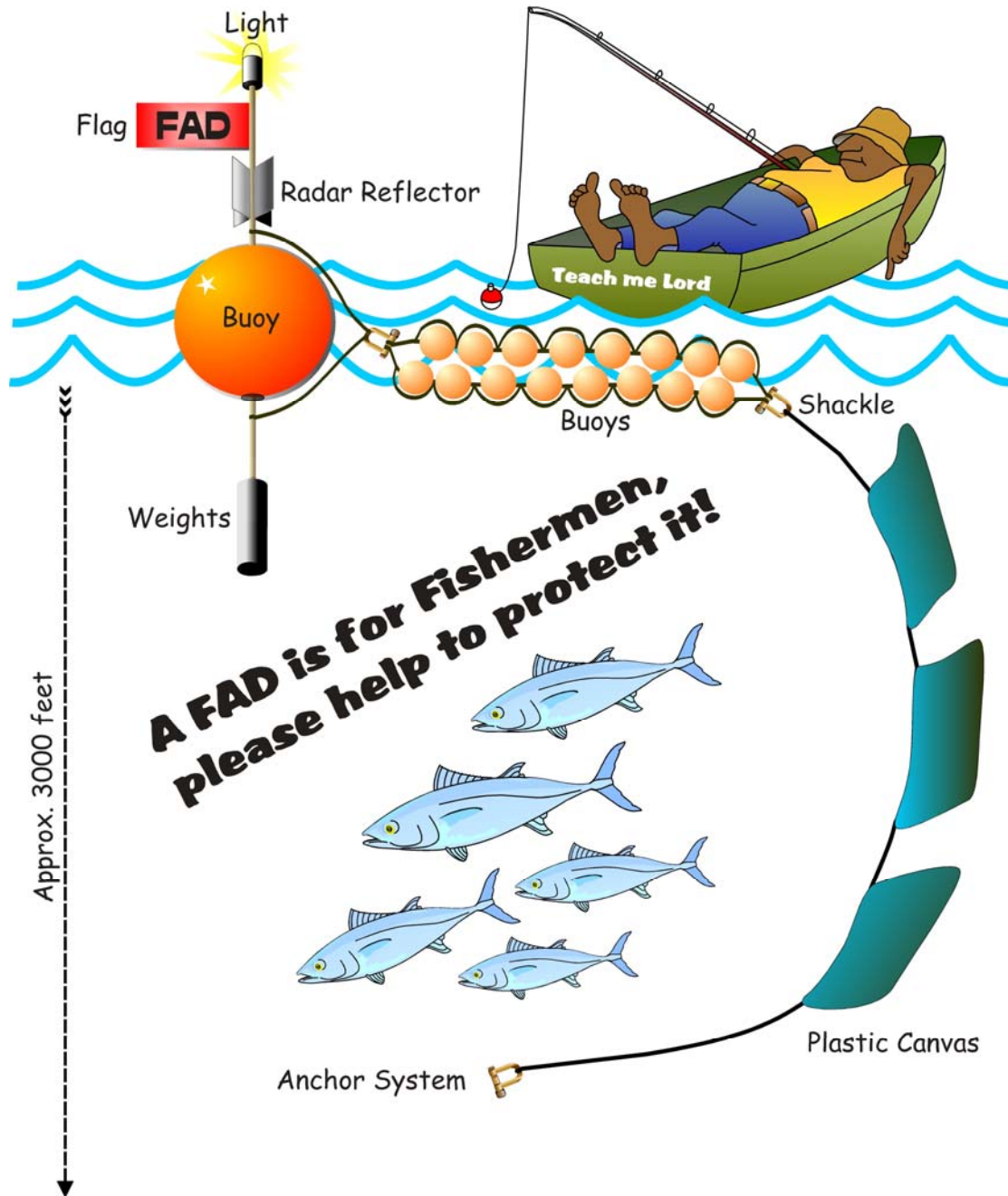
- Active involvement in the development of the tourism and fishing industries
- Notable improvement of resource base
- tripling of commercially important fish stocks in MRs and doubling in fishing areas within 6 years
- Informed management decisions
- Attitude of users changed from initial scepticism and resentment to full support in 2001
- Prohibition of destructive fishing gear

Progress



- Improved visitor safety and security
- Provision of information services
- Diversion and better distribution of fishing and tourism pressures
 - Establishment of FADs
 - Deep sea fishing training
 - Establishment of resource usage schedules
 - Size limitation of diving and snorkelling groups
 - Establishment of a sanctuary
- Effective conflict management mechanisms
- Development of alternative livelihoods
- Involvement in policy developing fora and

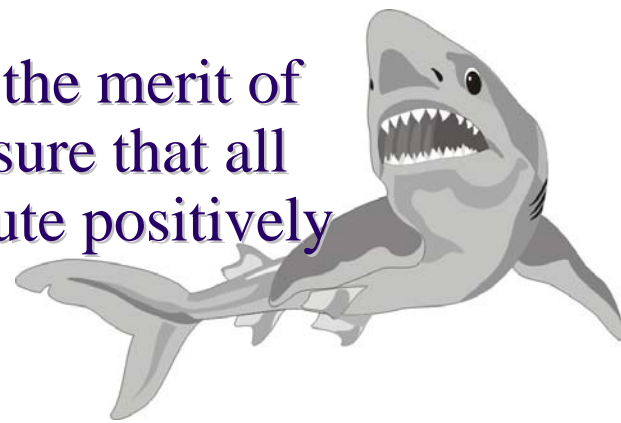
FISH AGGREGATING DEVICE (FAD)





Research & Monitoring Framework

- Goal: to increase the efficiency, effectiveness and quality of management
- Objectives:
 - to guide the involvement of students and researchers in research activities within the SMMA
 - Prevent negative impact on the SMMA and its ability to perform its role effectively.
 - Clear guidelines to assess the merit of research proposals and ensure that all research activities contribute positively to management





Research & Monitoring Framework

- Objectives (continued):
 - to enhance the availability and use of information and knowledge relevant to management
 - need for a more systematic look at requirements and opportunities:
 - to make sure that critical information needs are met,
 - that priorities and procedures are clearly defined,
 - that they support management decisions,
 - and that the effectiveness and impact of management are properly assessed
 - Lead- or supporting role of the SMMA in Research- & Monitoring activities/programmes





Research & Monitoring Framework

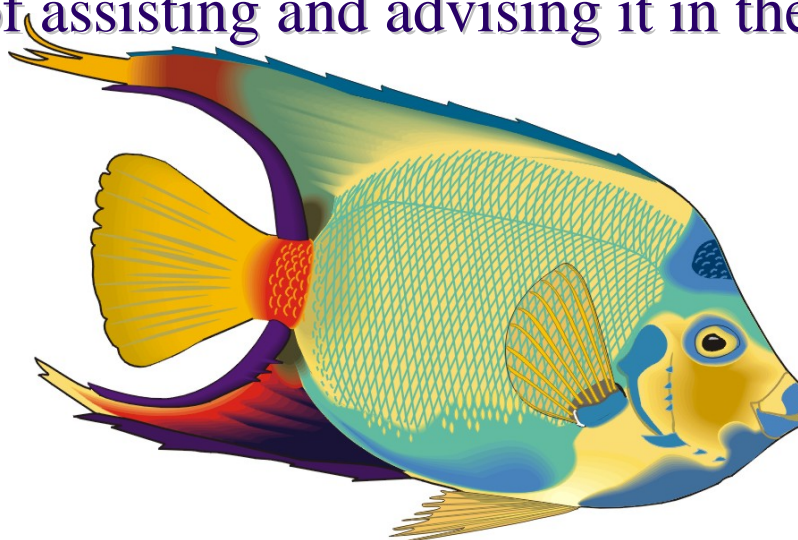
- Objectives (continued):
 - to document and analyse the experience of the SMMA.
 - Because of the novelty of the approaches it uses, the SMMA is seen by many within and outside this region as a learning and testing ground for participatory natural resource management
 - Need to ensure that learning takes place in a systematic and effective fashion.





Research & Monitoring Framework

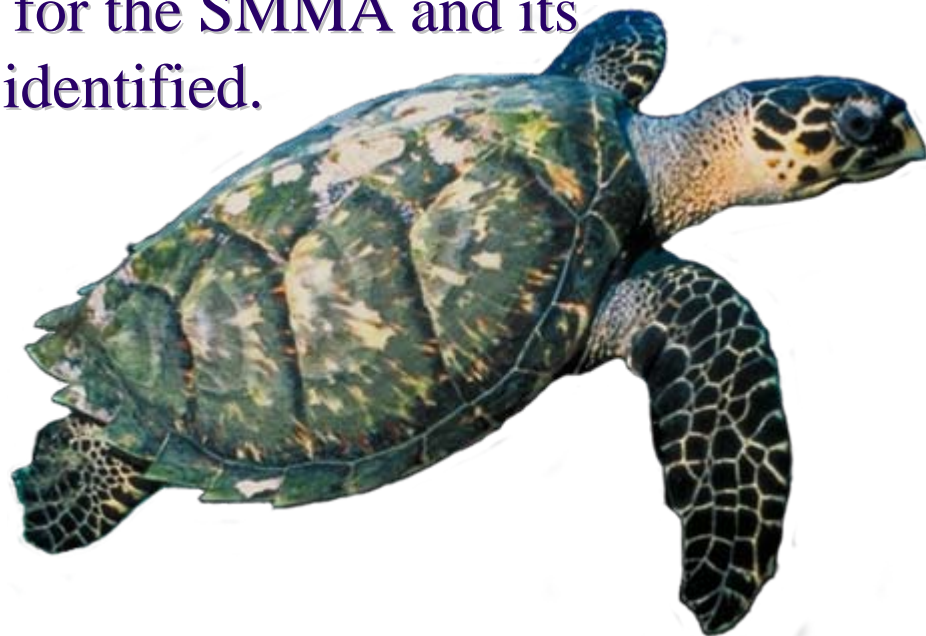
- Coordinating and advisory role of the BoD:
 - Based on terms and provisions of the Fisheries Act and other legislation
 - To ensure that information on research activities is disseminated to stakeholders, and organizes the redistribution of results
 - Establishment of a Scientific Committee for the purpose of assisting and advising it in these tasks.





Research & Monitoring Framework

- Not a work plan for the SMMA, because it covers a very broad range of issues and topics that cannot all be addressed.
- Compilation of all the needs and opportunities for research and monitoring that exist in the SMMA, within which the priority activities for the SMMA and its collaborators are identified.





Research & Monitoring Framework

- The purpose of the Framework is:
 - to improve decision-making in support of adaptive management
 - to increase efficiency and coordination of research and monitoring activities
 - to increase cost-effectiveness of research and monitoring investments
 - to develop research and monitoring protocols based on ‘best practice’





Research & Monitoring Framework

- Issues addressed are not static and are to be reassessed biannually by the Scientific Committee of the SMMA
- Ongoing identification and evaluation of new concerns to support adaptive management
- The specific monitoring and research tasks are prioritised when the SMMA work plans are developed, based on capacity and resources, and the degree to which these activities address the issues of highest priority.
- The work plans also determine the specific outcomes to be expected from the activities.



The Place of Monitoring & Research in Management

- *Research is the process by which questions are answered using the scientific method, applied to both natural and social issues*
- The essential characteristic of research is that it tests hypotheses in such a way that they can be rejected, revised and improve
- *Monitoring is an essential component of research.* When a hypothesis is erected and an experiment designed to test it, data are collected in the form of some response indicator, through the process of monitoring.
- Monitoring indicators of effectiveness of management can answer questions about management policy and strategy
- Monitoring is therefore a priority for the SMMA.



The Place of Monitoring & Research in Management

- *Research and monitoring activities must contribute to management objectives*
- In the new management agreement, these objectives are stated as:
 - conserve the coastal and marine resource base of Soufriere enhance the equitable economic, social and cultural benefits generated from the sustainable use of the coastal and marine resources of Soufriere at the local and national levels
 - manage the conflicts that may occur among uses and users of the coastal and marine resources in Soufriere





The Place of Monitoring & Research in Management

- While the emphasis is on research and monitoring activities that contribute to management, it is recognised that the SMMA can provide opportunities for pure research based on the experimental controls that will be offered by effective management.
- It is also noted that results from research that is apparently unrelated to management have provided information that is directly relevant, such as the identification of indicator species and the understanding of their links to changes in aspects of reef health.



The Place of Monitoring & Research in Management

- Against this background, the role of research and monitoring activities is to:
 - inform and educate stakeholders, and guide their management decisions
 - assess management effectiveness
 - generate new knowledge (in all disciplines, but particularly in the field of natural resource management)





Objective 1: Conservation of the coastal and marine Resource Base

Issues	Priority	Monitoring and research tasks	Work plan and status
Impacts of land-based activities and natural events	1	<ul style="list-style-type: none"> · monitor basic environmental variables, such as water temperature, turbidity, salinity, sedimentation, rainfall · monitor status of sea urchin (<i>Diadema</i>) populations · acquire baseline of community composition at selected sites, including reefs and seagrass beds · monitor profiles of selected beaches · determine species richness of key indicator species (e.g. fish and corals) · establish an effective participatory procedure for environmental and social impact assessment of future development projects 	
Impacts and effectiveness of management of resource use in the SMMA	1	<ul style="list-style-type: none"> · monitor status, and level of exploitation, of selected species · monitor level of recreational diving at selected sites · monitor the recovery of selected species from the prior status of over-exploitation · monitor status of fish stocks in different zones · monitor status of habitats in different zones · quantify capacity of marine reserves to contribute to fisheries in other zones 	

Objective 2: Enhancement of the equitable economic, social & cultural Benefits

Issues	Priority	Monitoring and research tasks	Work plan and status
Sustainability of current resource uses, based on participatory decisions on the limits of acceptable change	1	<ul style="list-style-type: none"> · monitor status of harvested resources · determine the impact on ecosystems of fishing, diving and snorkeling, yachting · monitor changing attitudes to resource use and management 	
Sustainability of alternative resource uses	2	<ul style="list-style-type: none"> · assess sustainability of offshore fisheries that are promoted as alternatives to the reef fishery 	
Opportunities for generating income and employment	1	<ul style="list-style-type: none"> · identify what are the viable alternatives for fishers and other users · study opportunities and impediments to people gaining access to alternative employment · assess employment transition due to increased or decreased opportunities · assess changes in the contribution of resource use to household economies as new employment opportunities become available 	
Equity in access to resources and in the distribution of benefits	1	<ul style="list-style-type: none"> · assess ability of fishers and other resource users to access alternative employment · identify and quantify who benefits vs. who loses 	
Social and economic impacts of the SMMA on various stakeholders, both positive and negative	1	<ul style="list-style-type: none"> · assess changes in employment due to management measures · evaluate economic, social and cultural benefits accrued since setup of the SMMA... 	
Resource valuation	2	<ul style="list-style-type: none"> · value fish species and assess how catch values may change as conditions change in response to management · value resource base, reefs, yachting sector, diving and snorkeling, access to recreational space 	



Objective 3: Conflict Management

Issues	Priority	Monitoring and research tasks	Work plan and status
Voluntary compliance and enforcement	1	<ul style="list-style-type: none"> · monitor activities which go against established rules and procedures · determine links between compliance and education levels and livelihoods · determine effectiveness of various methods of enforcement and test alternatives · determine cause of change in number of illegal activities · test forms and conditions (levels of education and livelihoods for example) of stakeholder involvement in surveillance and compliance · assess changes in social norms and attitudes regarding resources, methods used and social (vs legal) compliance 	
Quality of policy processes, and compatibility between national policy decisions and SMMA management objectives	2	<ul style="list-style-type: none"> · determine the linkage between SMMA objectives and national and regional policy objectives · assess policy implications for any perceived incompatibility in the above · assess impacts of policy processes on power relations and institutional capacity 	
Degree and effectiveness of stakeholder participation in management	1	<ul style="list-style-type: none"> · monitor level of understanding of the role of the stakeholder groups in the SMMA · monitor stakeholder participation in decision-making institutions and processes 	
Impact of SMMA on power relations	2	<ul style="list-style-type: none"> · document and analyse conflicts and decision-making structures and patterns 	



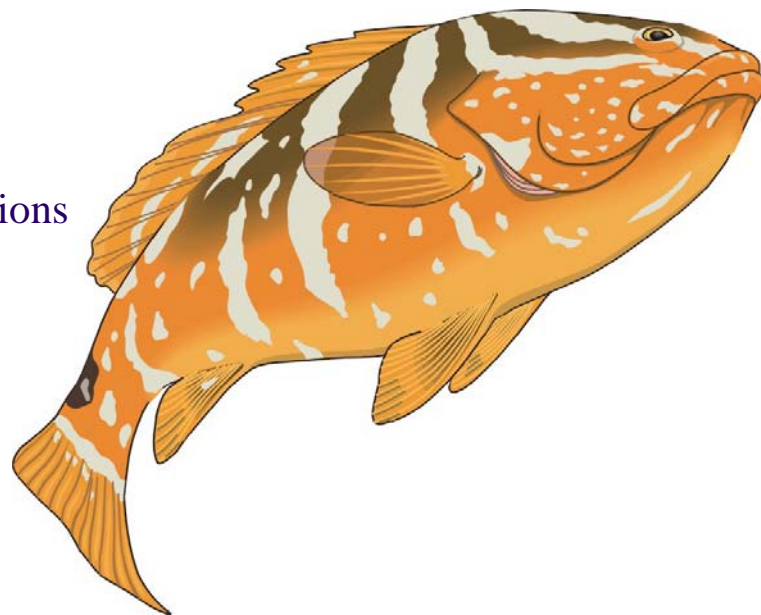
Objective 4: Testing & Development of Methods & Approaches

Issues	Priority	Research and monitoring tasks	Work plan and status
Methods and processes of participatory management, including: * stakeholder identification and analysis * communication * conflict management * organisational development * institutional design	2	<ul style="list-style-type: none">· implement communication plan and monitor impacts on attitudes and awareness· test different approaches to stakeholder analysis and conflict management	
Approaches and methods for implementation and enforcement	3	<ul style="list-style-type: none">· develop surveillance and enforcement strategy based on assessment of capabilities and legal framework of key agencies	



Research & Monitoring Framework

- Guidelines and procedures for the conduct of research
 - relevance to management
 - priority and urgency, as defined by this Framework
 - economic and financial feasibility
 - technical feasibility (human resources, skills and equipment)
 - financial and economic impact (including the use of local suppliers)
 - impact on local capacity (including the use of counterparts) community awareness and involvement
 - environmental impact
 - social impact
 - intellectual property considerations
 - ownership of data
- Terms & Conditions
- Management of Information





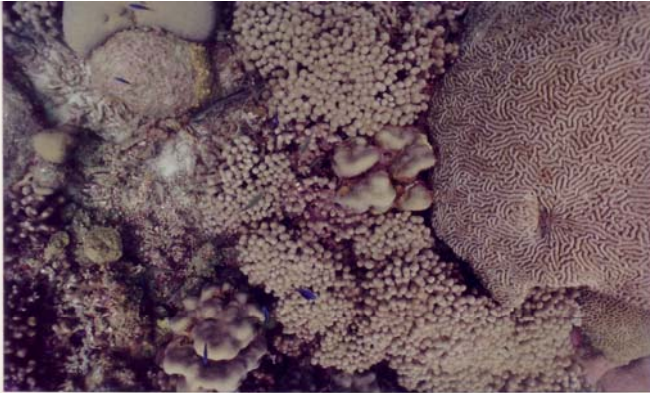
Routine Monitoring Activities

- Turbidity (Secchi Disk) – twice weekly
- Salinity (Refractometer) – twice weekly
- Water temperature (digital Hobo Water Temp Pro) – every four hours 0m, 5m, 10m
- Sedimentation levels – biweekly
- E-Coli levels – 1 weekly
- Reef Check – semi annual
- Beach dynamics – semi annual
- Weather parameter (rainfall, wind direction/speed, UV intensity, solar radiation etc.)
- Usage levels (diving & snorkeling)
- Fish landings (DoF)

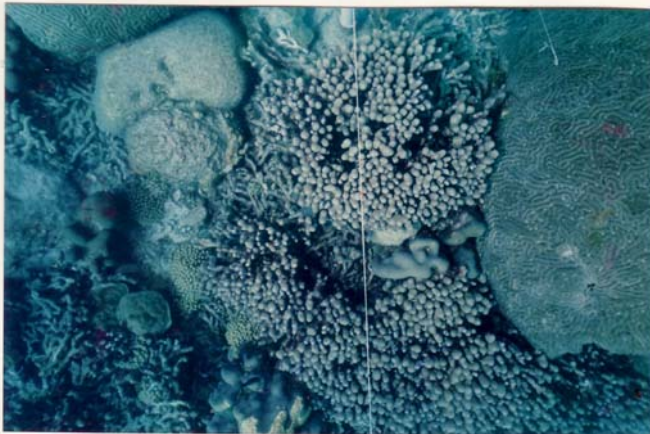


Photo Quadrates

NOVEMBER
1988



DECEMBER
1993



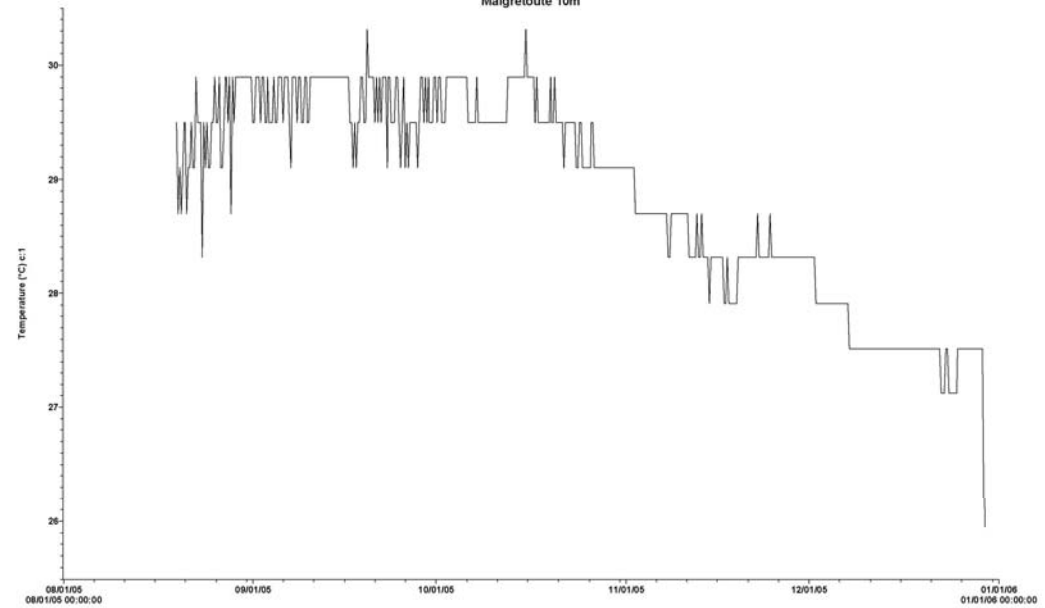
MARCH
1997



Water Temperature

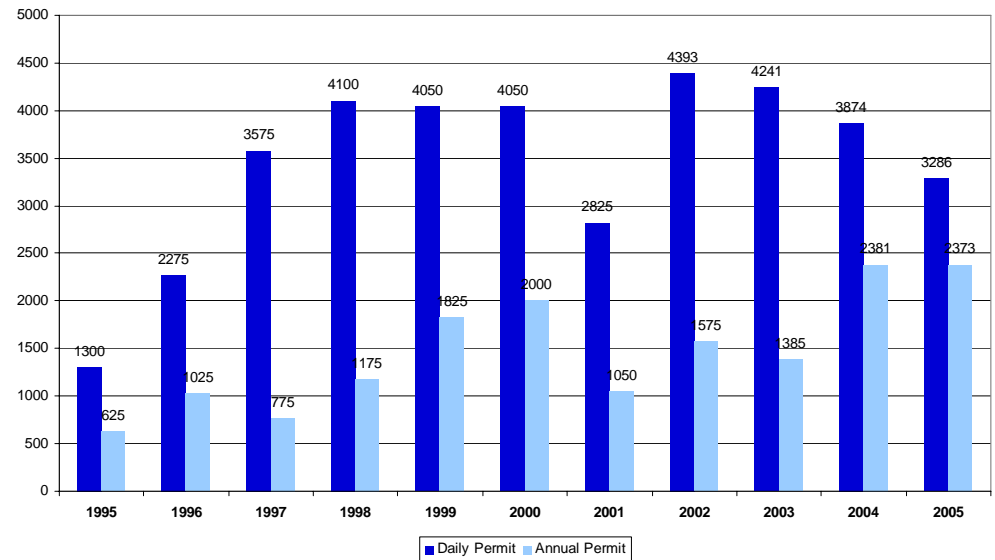
Aug. – Dec. 05

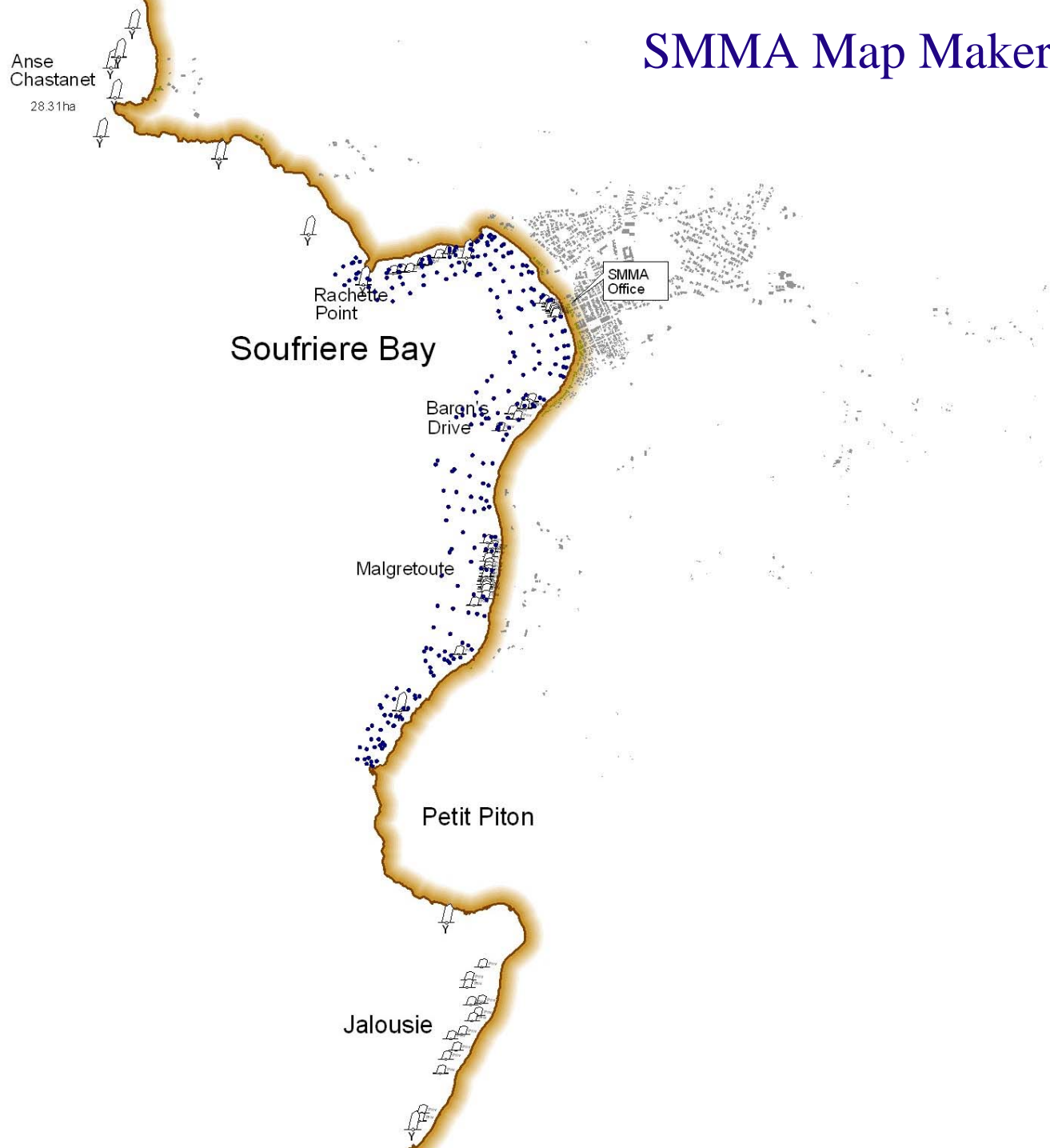
Malgetoute 10m



SMMA Dive Permits Sold

(Sandals resorts not included)





Date: _____

SMMA Daily Rangers' Log Sheet



Dive Operator	Resort Course	Daily Permit	Annual Permit	Snorkel Operator	# Snorkellers	Turbidity	Mo. - Wed. - Fri.	Salinity	Mo. - Wed. - Fri.
Action Adventure Divers				Action Adventure Divers		Anse Chastanet		Anse Chastanet	
Buddies Scuba				Buddies Scuba		Pinnacles		Trou Diable	
Dive Fair Helen				Eastern Caribbean Divers		Soufriere River		Pinnacles	
Eastern Caribbean Divers				Flying Ray		Malgretoute		Soufriere River	
Frogs				Frogs		Piton Wall		Malgretoute	
Jalousie Hilton				Le Sport Hotel		Coral Gardens		Jalousie	
Le Sport Hotel				Rendezvous Hotel					
Rendezvous Hotel				Sandals					
Sandals				Scuba St. Lucia					
Scuba St. Lucia				Balaou Limited					
Independent				Mystic Man Tours					
Other				Other					
Total (attach tickets)				Total (attach tickets collected)					

Surveillance	Time Start	Time End	Ranger Initials	Patrol/Incident Reports (use back of sheet if necessary)
Morning Patrol				No Infringements encountered <input type="checkbox"/>
Dive Check				Area covered:
Evening Patrol				
Night Patrol				

Maintenance	Inspection	Buoys damaged	Ranger Initials
Moorings	visual <input type="checkbox"/>		X
Demarcation Buoys	visual <input type="checkbox"/>		X
Boat Check AM:	Hull <input type="checkbox"/>	Safety <input type="checkbox"/>	Engine <input type="checkbox"/>
Damages must be reported immediately	Prop <input type="checkbox"/>	Lights <input type="checkbox"/>	Tank <input type="checkbox"/>
	Reeling <input type="checkbox"/>	Fenders <input type="checkbox"/>	X
Boat Check PM:	Hull <input type="checkbox"/>	Safety <input type="checkbox"/>	Engine <input type="checkbox"/>
Damages must be reported immediately	Prop <input type="checkbox"/>	Lights <input type="checkbox"/>	Tank <input type="checkbox"/>
	Reeling <input type="checkbox"/>	Fenders <input type="checkbox"/>	X
Weather Forecast read	7:00 AM <input type="checkbox"/>	1:00 PM <input type="checkbox"/>	6:00 PM <input type="checkbox"/>

MONITORING	Reef Check (every 6 months)	Sediment Traps (biweekly)
Turtle Reef	3m <input type="checkbox"/> - 10m <input type="checkbox"/>	Anse Chastanet c. <input type="checkbox"/> d. <input type="checkbox"/> w. <input type="checkbox"/>
Anse Chastanet	3m <input type="checkbox"/> - 10m <input type="checkbox"/>	Rachette Point c. <input type="checkbox"/> d. <input type="checkbox"/> w. <input type="checkbox"/>
Malgretoute	3m <input type="checkbox"/> - 10m <input type="checkbox"/>	Petit Piton Edge c. <input type="checkbox"/> d. <input type="checkbox"/> w. <input type="checkbox"/>
Coral Gardens	3m <input type="checkbox"/> - 10m <input type="checkbox"/>	Gros Piton Cliff c. <input type="checkbox"/> d. <input type="checkbox"/> w. <input type="checkbox"/>
Temperature Gauges	data downloaded to shuttle <input type="checkbox"/> - batteries changed <input type="checkbox"/> data transferred <input type="checkbox"/> - logger replaced <input type="checkbox"/>	

Signatures Rangers Shift 1 _____ Signatures Rangers Shift 2 _____ Signatures Rangers Shift 3 _____ Manager reviewed _____

What works & what doesn't?

■ Progress

- Shifting of priorities from management of users and uses to management of resources
- Community managed protocol
- Expanding activities
- Improved training and capacity
- Map Maker GIS (optimal display of analyses and results for decision making processes)

■ Constraints

- Responsibilities of SMMA too broad
- Lack of continuity
- Board priorities (financial, pressing issues)
- Perceived low importance of R&M
- Fluctuation changes of Board composition
- Limited capacity (Board members & staff)
- Political interference / indecisiveness
- Inconsistent support from volunteers (e.g. dive operators, visitors)





Thank You!